

Analysis Center of Saint Petersburg University

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Abstract

This report briefly summarizes the activities of the Analysis Center of Saint Petersburg University during 2008. Changes which happened in our solutions and staff, as well as our future plans, are described.

1. Introduction

The Sobolev Astronomical Institute is located in Petrodvorets, near Saint Petersburg. It is a research institute of the Saint Petersburg State University. In 1998 the Analysis Center of Saint Petersburg University was established in the Institute. Due to the staff changes in 2007 we had a gap in our submissions for IVS that year. The main activity of the SPU AC for the International VLBI Service before 2007 consisted of routine processing of 24-hour and 1-hour observational sessions for obtaining Earth Orientation Parameters (EOP) and rapid UT1-UTC values respectively. In 2008 we resumed submitting results of 24-hour session processing. During 2008 the activities of the SPU AC were supported by the Ministry of Education and Science of the Russian Federation (grant 2.1.1.5077).

2. Staff

Starting in 2008 a new member has become involved in the current processing of VLBI observations: a Ph.D. student of Saint Petersburg University, Dmitriy Trofimov. The person previously responsible for routine work — Maria Kudryashova — was temporarily involved in the work of the SPU AC in the middle of 2008. General coordination and support for the activities of the SPU AC at the Astronomical Institute was performed by Prof. Veniamin Vityazev.

3. Activities in 2008

- This year we resumed the operation of our center. Only routine estimation of the five Earth Orientation Parameters was performed. The OCCAM package software (version 6_2) was used for current processing of VLBI data [1]. In contrast to the previous versions of the same package, all the reductions are made in the system of the mean equinox. Matrices of partial derivatives have been defined more accurately in this version as well. Due to the above mentioned changes in the procedure of EOP estimation, a whole series of EOP has been re-processed. The new time series is named spu00004.eops. It includes data obtained by the IRIS-A, NEOS-A, R1, and R4 observing programs, and it covers a 20 year period (from January 2, 1989 until the end of 2008). The total number of processed experiments is about 1400.
- All parameters have been adjusted using the Kalman filter technique. For all stations (except the reference one), the wet delay, clock offsets, clock rates, and troposphere gradients were estimated. Troposphere wet delay and clock offsets were modeled as a stochastic process

such as a random walk. The clock rates and the troposphere gradients were considered to be the constant parameters.

- The main details of the preparation of the EOP time series spu00004.eops are summarized below:
 - Data span: 1989.01–2008.12
 - CRF: fixed to ICRF-Ext.2
 - TRF: VTRF2005 was used as an a priori TRF
 - Estimated parameters:
 1. EOP: $x, y, UT1 - UTC, d\psi, d\varepsilon$;
 2. troposphere: troposphere gradients were estimated as constant parameters, and wet troposphere delays were modeled as a random walk process;
 3. station clocks were treated as follows: offset as a random walk process, rate as a constant.
 - nutation model: IAU 1980
 - mapping function: VMF1
 - technique: Kalman filter
 - software: OCCAM v.6_2

4. Future Plans

In 2009 we plan to continue our regular work. Besides production of scientific data, we are going to include the practical work on deriving EOP from VLBI observations in the systematic curriculum of a special course on radio astronomy.

References

- [1] O. Titov, V. Tesmer, J. Boehm, OCCAM v. 6. 0 Software for VLBI Data Analysis, In International VLBI Service for Geodesy and Astrometry 2004 General Meeting Proceedings, N. R. Vandenberg and K. D. Baver (eds.), NASA/CP-2004-212255, pp.267-271, 2004.